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SOUTH RIVERDALE BLOOD LEAD TESTING - 1984

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TABLE OF CONTENTS

	Page
SUMMARY	1
BACKGROUND	2
METHODOLOGY	3
RESULTS	4
(1) Response Rate	4
(2) Testing Sites	6
(3) Screened Blood Lead Levels	6
(a) Sex	7
(b) Age	9
(4) Blood Lead Values 20+ ug/dl (0.97+ umol/l) 25+ ug/dl (01.21+ umol/L)	14
(5) Follow-up of Children with Blood Lead 20+ ug/dl (0.97+ umol/L)	14
DISCUSSION	20
(1) Response Rate	20
(2) Analysis of Blood Lead	21
(3) Comparison of Results 1982, 1983 & 1984	22
(4) Follow-up Results of Home Visits	22
(5) Further Soil Lead Testing	23
(6) Dental Health and Nutrition Education	23
(7) Costs	24
(8) Community Concern Regarding Objectionable Odours	24
(9) Comparison with other Lead Surveys of Children	24
RECOMMENDATIONS	24
REFERENCES	25
APPENDICES	
I Designated High Risk Area for Children under 6 years	26
II Flyer Advertising 1984 Health Fair for Children Under 6	27

SUMMARY

Blood lead testing has been conducted for three consecutive years on children under six years of age in a designated area in South Riverdale where soil lead levels frequently are greater than 1,000 ppm. Previous data showed that blood lead of young children tends to increase in such an area due to the ingestion of soil during play, etc. This urban area, roughly south of Queen Street East between Laing Street and Booth Avenue, has several industries including a lead smelter and streets with high traffic volume.

In 1984 a Street Health Fair for Children Under Six was conducted during mid-September and lead testing was done at various sites in a motor van supplied by the Ministry of the Environment, as well as in schools and a day-care centre in the area. In addition to lead screening, preschool dental health and nutrition education were also featured. The Fair was publicized both by the media and by house-to-house visits by community volunteers. A clown with free balloons and "Star Wars" toothbrushes were extra attractions for the young.

216 children or 61.7% of the target population of 350 were tested. The mean blood lead value was 15.5 ug/dl (0.75 umol/L) compared to 15.8 ug/dl (0.76 umol/L) for 70 children tested in 1983 and 14.0 ug/dl (0.68 umol/L) for 135 children tested in 1982. (In 1982 the lead analysis was done at the E.S.A. Laboratories in Massachusetts, U.S.A. Their methodology gave results which correlate well with the Provincial Public Health Laboratory used in 1983 and 1984 but which are consistently lower.)

Girls had a slightly higher blood lead (15.8 ug/dl or 0.76 umol/L) than boys (15.0 ug/dl or 0.72 umol/L) similar to 1983, but the reverse of 1982.

18.5% of the children had blood lead levels of 20+ ug/dl (0.97+ umol/L) in 1984 compared to 18.6% in 1983 and 13.3% in 1982. 6% in 1984 had blood lead levels of 25+ ug/dl (1.21+ umol/L).

A public health nurse and inspector visited the homes of these children. The possible sources of lead most common in the home environment were play areas with bare soil, and dust in the home. Home renovations with paint removal on houses over 50 years old, and proximity to gasoline stations were also commonly found.

The 8 children with screening blood lead levels of 30+ ug/dl (1.45+ umol/L) were checked at the Hospital for Sick Children. Of these, 2 were confirmed as having lead toxicity (not poisoning) by Centres for Disease Control 1985 criteria, that is, a blood lead of 25+ ug/dl (1.21+ umol/L) and an erythrocyte protoporphyrin (E.P.) of 35+ ug/dl (0.62+ umol/L). For the remaining 6 children the hospital reported 3 blood leads over and 3 under 20+ ug/dl (0.97+ umol/L).

The cost of this lead testing program, including planning, testing, follow-up and reporting was $97.02 per child tested.

These testing results will be compared with data from the Provincial Blood Lead Study of children to be reported by the Ministry of Health later in 1985, and recommendations will be made regarding testing in 1985 and soil replacement.

BACKGROUND

On April 12, 1983 the Board of Health considered the report (March 3, 1983) from the Medical Officer of Health respecting Lead Week October 1982 and adopted the recommendations, including:

> "(7) That the Department designate areas with soil leads greater than 1,000 p.p.m. as high risk for children aged 0 - 5.
>
> "(8) That the Department advise householders within known designated areas to have their children aged 0 - 5 years tested annually for blood lead as appropriate." (1)

The Ministry of the Environment provided a map with a soil lead 1,000 p.p.m. concentration isopleth centered around Canada Metal Company Ltd. (Appendix 1). This was constructed by computer from the results of surface soil sampling 1974 - 1983. It was observed that this isopleth differed only slightly from an earlier one constructed in 1974 - 1976 before soil replacement of 48 properties with soil lead of 2,600+ ppm.

Based on this isopleth, an area was outlined with the following approximate boundaries: on the east, Laing Street; on the south, the Gardiner Expressway; on the west, Booth Avenue up to Eastern Avenue and then Morse Street up to Queen Street; on the north, Queen Street over to Jones Avenue and then a small section north of Queen Street as far as Laing Street.

In the fall of 1983 "under six" lead testing clinics were held at three schools - Morse, St. Joseph's and Bruce - and at Woodgreen Day Care Centre for children living in the designated area. Only 70 children were tested, including one reported by a private physician. This is only 20% of our estimated "under six" population of 350 based on Statistics Canada F-55 Postal Code System (December, 1983) - too small a volunteer sample to consider the results to be representative of the target population.

On April 24, 1984, the Board of Health considered the report (April 12, 1984) from the Medical Officer of Health respecting the results of the Report on South Riverdale Blood Lead Testing, 1983

(2) and approved of a South Riverdale Street Health Fair in September 1984 with the purpose of testing at least 80% of the children under age six in the designated area. Testing would be done in a motorized van and combined with preschool health education on minimizing exposure to lead, nutrition related to lead, and dental health.

METHODOLOGY

Representatives from South Riverdale Community Health Centre's Environmental Health Committee, the Metro Toronto Police Force Community Relations Officers, and Woodgreen Community Centre met with Departmental staff to plan the clinics.

The Ministry of the Environment graciously offered to provide their emergency van and driver for the Street Health Fair provided it was not required for an environmental emergency. A back-up rental plan was in place.

Arrangements were made to test children who lived in the high risk area and attended the kindergartens at St. Joseph's Separate School, Bruce Public School, Morse Public School and Woodgreen Day Care Centre, at these sites.

During the week prior to the Street Health Fair volunteers from the South Riverdale Community Health Centre's Environmental Health Committee and from Katimavik, (a Canada national youth volunteer service programme), did a house-to-house canvas of the neighbourhood, distributing notices (Appendix II) and pamphlets and doing an informal census of the children under six years of age in the designated area. Some consents were signed by parents at this time, and a note was made of homes where an interpreter was required.

Volunteers were present at each clinic to assist in hand washing, crowd control and bringing children from their homes. Two volunteer clowns kept the children entertained while waiting. A short orientation session was arranged for the volunteers prior to the Health Fair. Media coverage and promotion were organized by a community health officer with the assistance of the Department's Public Relations Coordinator.

The Ministry of the Environment driver kindly assisted with loading and unloading the van at each stop, and ensuring a supply of electricity and water.

The clinics were staffed by a nurse, a physician, a clerk, a dental hygienist and assistant, and a community health officer. Following the finger prick, the children with their parents

visited the dental hygienist where they received instruction in minimizing contact with lead, eating healthy foods and good tooth care, as well as a free "Star Wars" toothbrush. The clowns sent the children home to bed with a balloon and a happy smile.

As in 1983, the capillary blood specimens were sent to the Provincial Public Health Laboratory for lead analysis. Results were reported in S.I. units (umol/L) and these were converted to metric units (ug/dl) by the computer. The parents were notified by letter of the results. Visits were made to the homes of children with blood lead levels of 20+ ug/dl (0.97+ umol/L) by public health nurses and inspectors to identify possible sources of lead and to advise on means of reducing exposure.

Analysis of the data by age and sex was done by the Eastern Health Area data analyst. Using data from the Statistics Canada F-55 Postal Code System, an estimate of the numbers of children aged 0 - 5 years living in the designated area was calculated. 1982, 1983 and 1984 results from this target group were compared.

RESULTS

(1) Response Rate

The response rate in 1984 was almost 3 times that of 1983. Relatively more females than males were tested this year compared to the last 2 years when males and females were nearly equal. See Table I.

Table I - Response Rate 1984 Compared with 1982 and 1983

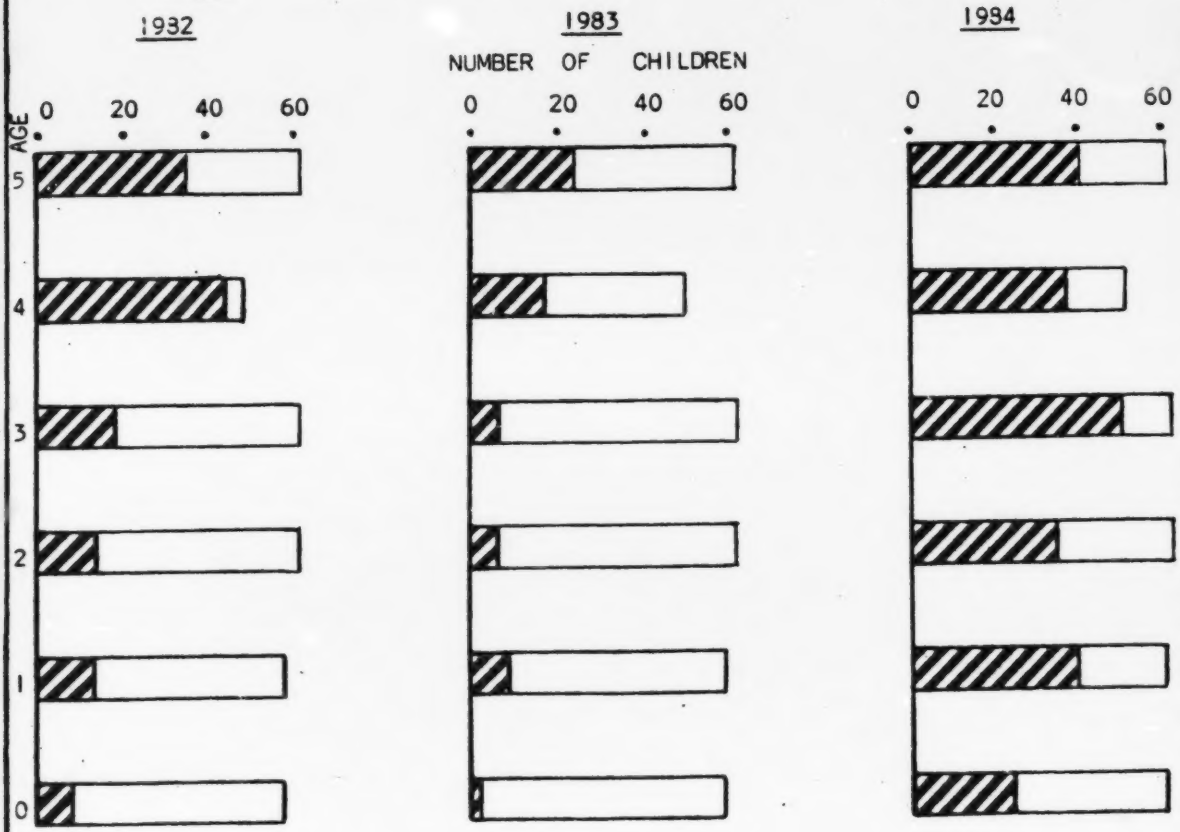
	1982		1983		1984	
Estimated Target Pop. 0-5 years	Number Tested	% of Target	Number Tested	% of Target	Number Tested	% of Target
350	68 female 67 male = 135	38.6%	34 female 36 male = 70	20%	121 female 95 male =216	61.7%

For the proportion of the target children tested by age for the years 1982, 1983, 1984 see Figure 1.

In addition to the target population we tested 27 children aged 6 years and older living in the designated area.

FIGURE 1

PROPORTION OF TARGET CHILDREN TESTED
BY AGE 1982 - 84



LEGEND

Sample Tested

Living within Target Area

We also tested 74 others (including 4 adults) from outside the target area. This was done as a courtesy to the concerned parents who brought their children or sent a signed consent. Follow-up was the same as for the target group but the data were not included in the analysis of blood lead values.

(2) Testing Sites

The van was scheduled for 11 stops during the week of September 17 - 22. The number tested at each site - including those living inside and outside the test area - averaged 25 (range 22 - 32). See Table II.

Table II - Number Tested in Van, Kindergartens and Day Care Centre

	Total Tested	Number of Target Group Tested	Number In Designated Area, Age 6+ years Tested	Number of Others Tested
Van	272	204	27	41
Bruce School	8	3		5
St. Joseph's School	17	2		15
Morse	15	4		11
Woodgreen Day Care Centre	5	3		2
	317	216	27	74

(3) Screened Blood Lead Levels

The mean blood lead level for the 216 children under six in the designated area was 15.5 ug/dl (0.75 umol/L) compared to 15.8 ug/dl (0.76 umol/L) for the 70 children tested in 1983, and 14.0 ug/dl (0.68 umol/L) for 135 children tested in 1982.

(a) Sex

Females had a higher arithmetic mean blood lead (15.8 ug/dl or 0.76 umol/L) than males (15.0 ug/dl or 0.72 umol/L). This was similar to 1983 when the female mean blood lead was 16.2 ug/dl (0.78 umol/L) and the male was 15.4 ug/dl (0.74 umol/L). In 1982 the male mean blood lead was 14.3 ug/dl (0.69 umol/L), slightly higher than the females (13.6 ug/dl or 0.66 umol/L). See Table III and Figure 2.

Table III - Distribution of Blood Lead by Sex

Number (Percentage of Row)

ug/dl (umol/L)	0-4 (0-.23	5-9 .24-.47	10-14 .48-.71	15-19 .72-.96	20-24 .97-1.20	25-29 1.21-1.44	30+ 1.45+)	Total
Female	0 (0.0)	13 (10.7)	42 (34.7)	40 (33.1)	18 (14.9)	3 (2.5)	5 (4.1)	121
Male	0 (0.0)	8 (8.4)	39 (41.1)	34 (35.8)	9 (9.5)	2 (2.1)	3 (3.2)	95
All	0 (0.0)	21 (9.7)	81 (37.5)	74 (34.3)	27 (12.5)	5 (2.3)	8 (3.7)	216 (100.0)

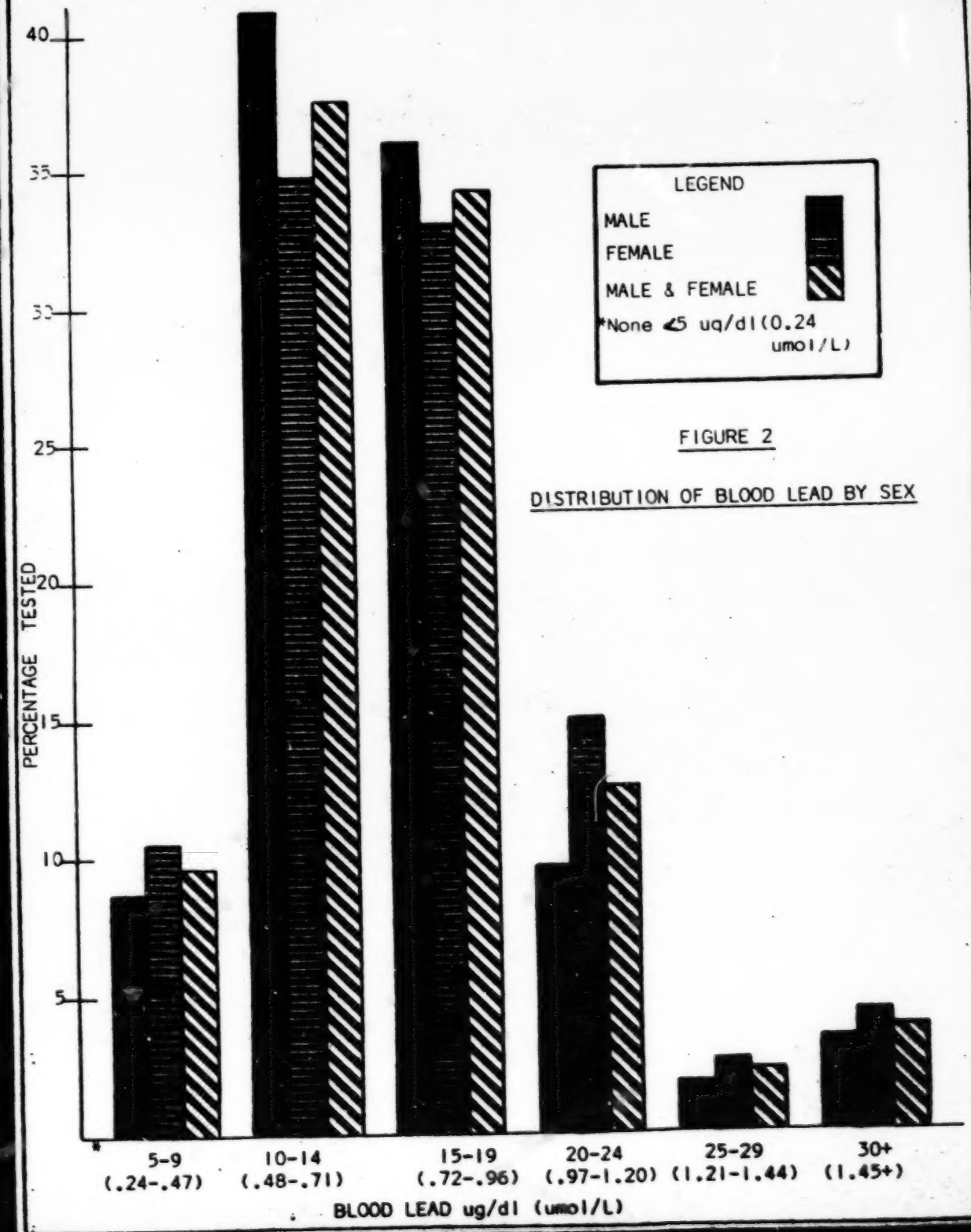


FIGURE 2

DISTRIBUTION OF BLOOD LEAD BY SEX

(b) Age

Screened blood lead levels by age are shown in Table IV and Figure 3.

Table IV - Distribution of Blood Lead by Age

Number (Percentage of Row)

ug/dl (umol/L)		0-4 (0-.23	5-9 .24-.47	10-14 .48-.71	15-19 .72-.96	20-24 .97-1.20	25-29 1.21-1.44	30+ 1.45+)	Total
Age	0	0	8	10	3	1	0	1	23
		(0.0)	(34.8)	(43.5)	(13.0)	(4.4)	(0.0)	(4.3)	
in	1	0	2	11	13	8	2	1	37
		(0.0)	(5.4)	(29.7)	(35.1)	(21.6)	(5.4)	(2.7)	
Years	2	0	2	10	14	6	0	1	33
		(0.0)	(6.1)	(30.3)	(42.4)	(18.2)	(0.0)	(3.0)	
	3	0	2	24	16	2	2	2	48
		(0.0)	(4.2)	(50.0)	(33.3)	(4.2)	(4.2)	(4.2)	
	4	0	3	13	15	3	1	1	36
		(0.0)	(8.3)	(36.1)	(41.7)	(8.3)	(2.8)	(2.8)	
	5	0	4	13	13	7	0	2	39
		(0.0)	(10.3)	(33.3)	(33.3)	(18.0)	(0.0)	(5.1)	
TOTALS		0 (0.0)	21 (9.7)	81 (37.5)	74 (34.3)	27 (12.5)	5 (2.3)	8 (3.7)	216 (100.0)

The least squared means of the blood lead values with the standard errors by age in years are shown in Table V. No significant difference by age was found except for children under one year who had significantly lower lead levels in 1982 and 1984.

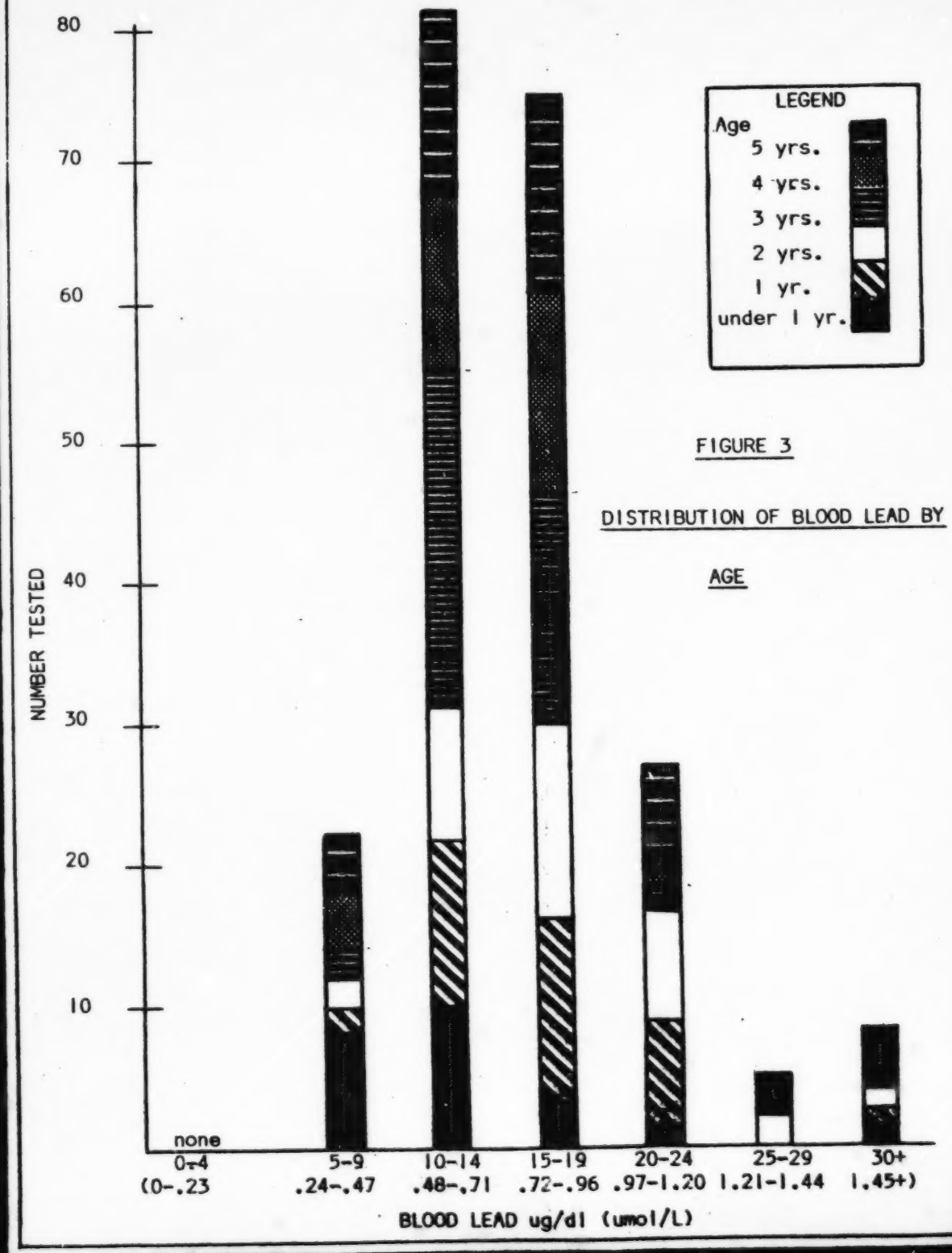


FIGURE 3

DISTRIBUTION OF BLOOD LEAD BY AGE

Table V - Least-Squared Mean Blood Lead by Age

Age in Years	n	Blood Lead Least Sq. Mean ug/dl (umol/L)	SE of Mean ug/dl (umol/L)	P
1982				
0	8	10.7 (0.52)	1.8 (0.09)	0.02
1	14	16.0 (0.77)	1.4 (0.07)	0.08
2	14	12.5 (0.60)	1.4 (0.07)	0.12
3	19	15.4 (0.74)	1.2 (0.06)	0.70
4	45	14.8 (0.71)	0.8 (0.04)	0.06
5	35	12.6 (0.61)	0.9 (0.04)	
	135			
1983				
0	4	12.2 (0.59)	2.3 (0.11)	0.32
1	9	15.1 (0.73)	1.6 (0.08)	0.93
2	8	14.9 (0.72)	1.6 (0.08)	0.89
3	7	15.2 (0.73)	1.8 (0.09)	0.51
4	18	16.6 (0.80)	1.1 (0.05)	0.98
5	24	16.6 (0.80)	1.0 (0.05)	
	70			
1984				
0	23	12.3 (0.60)	1.2 (0.06)	0.003
1	37	16.7 (0.81)	0.9 (0.04)	0.55
2	33	15.9 (0.77)	1.0 (0.05)	0.55
3	48	15.1 (0.73)	0.8 (0.04)	0.71
4	36	15.6 (0.75)	0.9 (0.04)	0.84
5	39	15.8 (0.76)	0.9 (0.04)	
	216			

When the least squared mean blood lead for each age was compared for 1982, 1983 and 1984 a fairly stable pattern was observed over the three years. This is shown in Table VI and Figure 4.

Table VI - Least Squared Mean Blood Lead For Each Age Comparing 1982, 1983, 1984

Age in Years	n	Blood Lead Least Sq. Mean ug/dl	(umol/L)	SE of Mean ug/dl	(umol/L)
0-1982	8	10.8	(0.52)	1.8	(0.09)
1983	4	12.2	(0.59)	2.3	(0.11)
1984	23	12.3	(0.60)	1.2	(0.06)
1-1982	14	16.0	(0.77)	1.4	(0.07)
1983	9	15.1	(0.73)	1.6	(0.08)
1984	37	16.7	(0.81)	0.9	(0.04)
2-1982	14	12.5	(0.60)	1.4	(0.07)
1983	8	14.9	(0.72)	1.6	(0.08)
1984	33	15.9	(0.77)	1.0	(0.05)
3-1982	19	15.5	(0.75)	1.2	(0.06)
1983	7	15.2	(0.79)	1.8	(0.09)
1984	48	15.1	(0.73)	0.8	(0.04)
4-1982	45	14.8	(0.71)	0.8	(0.04)
1983	18	16.6	(0.80)	1.1	(0.05)
1984	36	15.6	(0.75)	0.9	(0.04)
5-1982	35	12.6	(0.61)	0.9	(0.04)
1983	24	16.6	(0.80)	1.0	(0.05)
1984	39	15.8	(0.76)	0.9	(0.04)

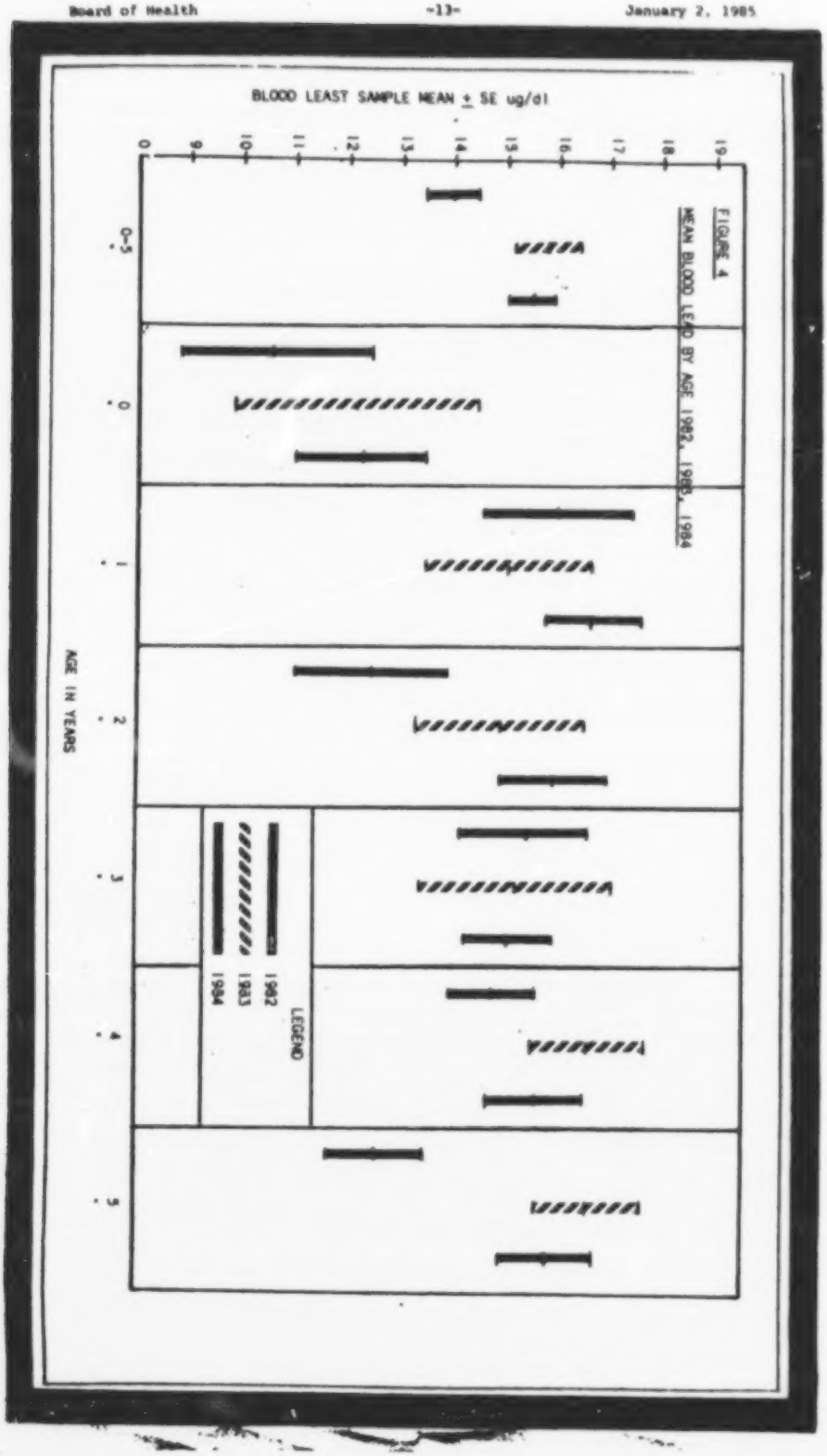


FIGURE 4
MEAN BLOOD LEAD BY AGE 1982, 1983, 1984

(4) Blood Lead Values 20+ ug/dl (0.97+ umol/L) and 25+ ug/dl (1.21+ umol/L).

The percentage of children in 1984 with blood lead values 20+ ug/dl (0.97+ umol/L) and with blood lead values 25+ ug/dl (1.21+ umol/L) were compared with 1982 and 1983 combined using chi-square. No significant difference was demonstrated. The results are shown in Table VII and Figure 5.

Table VII - Percentage With Blood Lead 20+ ug/dl (0.97+ umol/L) and 25+ ug/dl (1.21+ umol/L) Compared for 1982, 1983 and 1984.

Year	20+ ug/dl (0.97+ umol/L) Number		%	25+ ug/dl (1.21+ umol/L) Number		%
1982	18/135		(13.3)	4/135		(3.0)
	)	31/205		)	7/205	
1983	13/ 70		(18.6)	3/70		(4.3)
	)			)		
	)					
1984	40/216		(18.5)	13/216		(6.0)
	p = 0.35* (N.S.)			p = 0.21* (N.S.)		

*P-values from chi-square test

(5) Follow-up of Children with Blood Lead 20+ ug/dl, (0.97+ umol/L).

A public health nurse and inspector visited the homes of these children to determine individual sources of possible exposure to lead in the home environment and to advise on ways to reduce it.

The Ministry of the Environment was requested to do soil lead sampling at homes not previously tested.

The sources of lead exposure common to all the children in the designated area are:

- Urban air pollution from motor vehicles using leaded gasoline. All children live within a block from streets with heavy motor traffic.

- Soil leads in the area are frequently over 1,000 ppm. All children live in an industrial area.

Forty (40) children were identified for follow-up in the designated area. Table VIII shows sex, age and length of

residence in the area. Table IX notes the streets involved. Table X summarizes the follow-up data.

FIGURE 5

PERCENTAGE OF BLOOD LEAD LEVELS
20 ug/dl+, 25 ug/dl+ in 1982, 1983, 1984

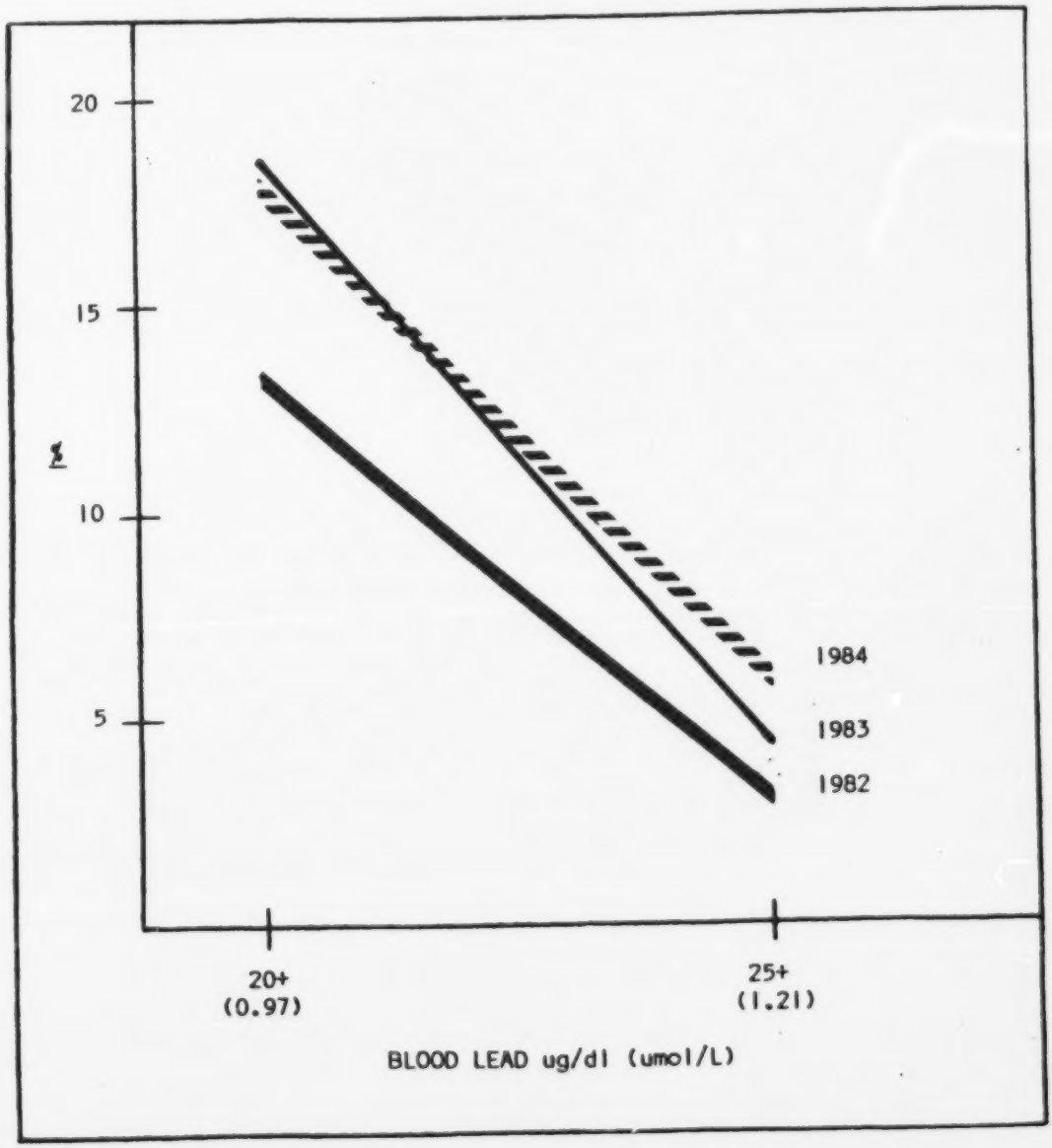


Table VIII - Distribution by Sex and Age and Length of Residence in the Area

Age in Years	Female	Male	Male and Female	Total Age in Months	Total Length of Residence in Area in Months	% of Life Spent in Area %
0	2	0	2	12	12	100
1	7	4	11	*180	132	73.7
2	3	4	7	210	131	62.4
3	6	0	6	252	109	43.2
4	1	4	5	*216	116	53.7
5	7	2	9	*528	404	76.5
	26	14	40	1398	904	64.7%

* 3 children had unstated length of residence because follow-up was not done and their age is not included in the total.

Table IX - Distribution of Residences

Street/Avenue	Number of Children
Berkshire Avenue	3
Carlaw Avenue	1
Caroline Avenue	12
Heward Avenue	4
Laing Street	2
Larchmount Avenue	2
Leslie Street	3
Logan Avenue	2
Morse Street	4
Mosley Street	1
Pape Avenue	2
Rushbrooke Avenue	3
Winnifred Avenue	1
	40

Table X - Summary of Follow-Up

	Yes	No	Comments
Follow-up completed	37	3	- 1 refused; 2 not required because blood lead was 19.7 ug/dl (0.95 umol/L), i.e., below criterion
Born in Canada	30	7	- 2 in China; 5 in Viet Nam
Lived all their life in area	22	15	
Single parent	8	29	
Housing in good condition	12	25	- the 25 were in fair condition
Housing more than 50 years old	22	2	- 13 unstated
Lead pipes	0	37	- Health inspector's report.
Lead worker in home	7	30	- included welder, solderer, plumber, metal joiner.
Yard all/part bare soil	7	19	- 1 had no yard.
Yard used for play	27	7	- 1 unstated
Renovations	15	22	- included sand blasting, wall and paint removal.
Excessive dust as reported by resident:			
in house	19	18	
on driveway	12	16	- 9 unstated
on sidewalk	14	17	- 6 unstated
Gas station within 1 block	21	16	- of these 16, 9 were within 1 kilometre of a gas station
Inspection:			
good housekeeping	14	23	- of these 23, 21 were fair, 2 poor.
good hygiene	18	19	- of these 19, 16 were fair, 3 poor.
visible dust	16	21	
peeling paint	24	13	

Family Activities:			
hobbies with possible lead exposure	2	35	- included auto repair and furniture refinishing
use of handmade pottery	0	37	
smokers in house	28	9	
home grown vegetables used	12	25	- all 12 washed them; 11 used a few, 1 used a large amount
Electric kettle used	20	17	- all recent models meeting Canada Safety Association Standards
Pets	22	15	- 11 dogs, 12 cats, 3 other
Eats or chews paint	1	35	- 1 unstated
Eats dirt possibly	6	30	- 1 unstated
History of anaemia	2	33	- 2 unsure
Pica	0	37	
Juice stored in ceramic or soldered container	6	30	- 1 unstated
Takes natural remedy e.g., dolomite	0	37	
Tested in 1983 and 20+ ug/dl (0.97+ umol/L)	1	36	dropped 1 ug/dl
Tested in 1982 and 20+ ug/dl (0.97+ umol/L)	2	35	dropped 4 and 1 ug/dl
With none of the above risk factors	0	37	

The 8 children with screening blood lead 30+ ug/dl (1.45+ umol/L) attended the Hospital for Sick Children for further tests. The average blood lead of the hospital tests was 22.0 ug/dl (1.06 umol/L) - range 10.8 - 31.7 ug/dl (0.52 - 1.53 umol/L).

(2 childen from just outside the boundaries with screening blood lead levels above 30 ug/dl (1.45 umol/L) were tested at the Hospital for Sick Children and had an average blood test of 22.8 ug/dl (1.10 umol/L).

DISCUSSION:

(1) Response Rate

When the volunteers did their informal census survey in early September it appeared that our previous estimates from the 1981 Census had overestimated the target population. The Statistics Canada F-55 Postal Code System provides a more accurate estimate as it is based on Family Allowance Program data. With a response rate of 61.7%, we are satisfied that our results are fairly representative of the children under six in the target area.

Our objective of testing 80% of the target population was not achieved. Possible reasons for this may be:

1. The population may still be overestimated. The postal zones were grouped and extended slightly beyond our boundaries. The data were compiled in December 1983. Some children may have moved away. A total for children aged 0 years (i.e., 1 - 11 months old) was not given so an estimate was made by averaging the 5 years given.

2. Some parents may not wish their children to have a blood test. This is not uncommon among Chinese people, and there is a fairly large Chinese community in the area.

3. A few children refused to be tested.

4. Some people are unwilling to participate in a survey or use a public health service.

5. Public lethargy may be a factor in spite of easy accessibility to the testing, good media coverage and local promotion.

(2) Analysis of Blood Lead

The blood lead analysis in 1982 was done at E.S.A. Laboratories in Massachusetts using a polarographic technique of anodic stripping voltometry. The Ontario Provincial Public Health Laboratory analyzed the specimens in 1983 and 1984 using atomic absorption spectrometry which gives slightly higher readings (3). The correlation between the 2 labs was tested and found to be good.

It was noted that all the blood tests reported from the Hospital for Sick Children were lower than our screening test results, although the samples from the Hospital for Sick Children and our lead screening were all analyzed at the Provincial Public Health Laboratories.

Possible explanations for this are:

1. The retests at the Hospital for Sick Children were usually done several weeks after our screening tests. Lead is absorbed rapidly from the blood into the body tissues and excreted in the urine. The children would be expected to have less outdoor activities and exposure to lead in the soil and air in the later fall than in September. Also the parents probably have followed the advice of the public health nurse on ways to reduce exposure to lead after the home visit.

2. Venous samples give lower values than capillary specimens probably because there is more skin contamination with the capillary method. However if the finger has to be squeezed, tissue fluid may dilute the blood and this would tend to lower the lead level.

In any future lead testing program, children with an initial screening value of 20+ ug/dl (0.97+ umol/L) should have a repeat capillary blood test done as soon as feasible by the public health nurse during the home visit for assessment of possible lead sources. Those with blood lead values of 25+ ug/dl (1.21+ umol/L) on the second screening test should be referred to the Hospital for Sick Children for further examination. This would reduce the number of referrals in which lead toxicity is not demonstrated, with the resulting reduced cost and inconvenience.

The U.S. Centres for Disease Control (CDC) (4) have recently lowered their criteria for lead toxicity, from 30+ ug/dl (1.45+ umol/L) to 25+ ug/dl (1.21+ umol/L) together with an erythrocyte protoporphyrin (E.P.) of 35+ ug/dl (0.62+ umol/L). (The previous E.P. criterion was

50 ug/dl (0.90 umol/L). This change was anticipated and we are following up on levels of 20+ ug/dl (0.97+ umol/L) or more.

(3) Comparison of Results 1982, 1983 and 1984.

A fairly stable pattern of least squared means for each age throughout the 3 survey years was shown in Table VI. In Figure 4 a significant difference for children under one year compared to older children is noted. This is probably explained by the fact that young infants are less exposed to dust and contaminated soil than older children. In 1983 and 1984 the 5 year olds were not different from the others whereas in 1982 they had a lower mean. This may be due to sample bias in 1982.

In comparing the proportions of children with lead values 20+ ug/dl (0.97+ umol/L) and 25+ ug/dl (1.2+ umol/L) in Table VII, the small numbers of 1982 and 1983 were combined so that chi-square analysis could be used.

The percentage of children with lead values 30+ ug/dl (1.45+ umol/L) were not compared for differences because of small numbers and because of the lowered C.D.C. criteria for lead toxicity described above.

In short, the picture is not changing - the children's blood lead is neither better nor worse.

(4) Follow-up Results of Home Visits

Because of the frequency of chipped and flaking paint in the reports, and the numerous houses over 50 years old, we have requested that paint specimens from 10 houses be analyzed for lead - 2 from the children with confirmed blood lead levels of 30+ ug/dl (1.45+ umol/L) and 8 from a randomized selection of houses visited in the follow-up.

These children living in an urban industrial environment all have common sources of lead exposure and in the follow-up not one child was free from all possible risk factors in the individual home environment. Some of the commonly reported factors were excessive dust, patches of bare soil in the children's play yards, only fair housekeeping and hygiene, pets - which probably bring dust into the home, old houses with flaking paint and renovations, and proximity to gas stations.

(5) Further Soil Lead Testing

The Ministry of the Environment tested the soil at the homes of children with blood lead levels of 20+ ug/dl (0.97+ umol/L) if not previously tested. Available results of these and previous tests have been marked on a map of the designated area.

(6) Dental Health and Nutrition Education

Two "tooth fairies" - a dental hygienist and assistant - demonstrated the correct method of brushing teeth, using a giant set of false teeth and a huge toothbrush. The message for toddlers and children to clean their teeth regularly was reinforced with free "Star Wars" tooth brushes.

The importance of a healthy, balanced and nutritious diet was emphasized in the nutrition education. It also pointed out that when calcium intake is poor, there is an increased risk for lead toxicity; and that iron deficiency appears to increase the susceptibility to lead toxicity (5).

This part of the Health Fair was enthusiastically received, with parents and older children joining in.

Although there was no formal evaluation, it seems that a mobile "Health Fair" setting might be a suitable tool for reaching preschoolers and their families with other prevention programs.

(7) Costs

Van Testing	Estimates April/84		Actual
Clinic Staff	2,344.17		2,111.54
Part-time RN	349.50		-
Dental Staff			730.74
Community Health Officer			786.80
Pick-Up Clinics			292.50
Clinic Supplies	)	112.63	
Sandwich boards	)	48.69	
Map: Mounted & Overlay	) 972.50	100.00	
Data: Statistics Canada	)	68.00	
Printing: Flyers, Posters, etc.	)	576.98	
		906.30	906.30
Lab Analysis	455.00		240.87*
Honoraria: Clowns	125.00		140.00

Balloons & Helium	169.00	170.00
Photography		96.03
Taxi, volunteers refreshments		41.31
Van	785.00	
	5,200.17	5,516.09
Additional Costs: Planning, follow-up, data analysis, report preparation		7,794.70
Total Cost	TOTAL:	$15,755.79

(or $97.00 per child tested)

* $502.46 less $261.59 for 101 tests of children aged 6+ years or living outside designated area.

(8) Community Concern Regarding Objectionable Odours

During the course of recent community discussion regarding sources of persistent or recurrent objectionable odours which impinge on South Riverdale, it has been alleged that Canada Metal Company is one such source. Present evidence based on citizen complaints, Ministry of the Environment or Department of Public Health staff visits to the plant, and analysis of industrial processes within the plant do not support this allegation.

(9) Comparison with other Lead Surveys of Children.

The Province of Ontario has conducted a blood lead survey of kindergarten and grade 1 children, with some younger siblings also tested, in schools in a random selection of sites, both urban and non-urban. It is expected that the Ministry of Health will publish this report later in 1985.

RECOMMENDATIONS:

1. That the foregoing findings in South Riverdale be compared with the findings of the Ontario Blood Lead Study of children when it is published .

2. Following this comparison a report be submitted to the Board of Health with recommendations regarding further blood lead testing and/or possible soil replacement in South Riverdale.

REFERENCES

1. City of Toronto Department of Public Health, Report on Lead Week October 4 - 8, 1982, the Board of Health, April 12, 1983.

2. City of Toronto Department of Public Health, Report on South Riverdale Blood Lead Testing, 1983, the Board of Health, April 24, 1984

3. Centre du Toxicologie de Quebec "Interlaboratory Comparison Program Newsletter", Le Centre Hospitalier de l'Universite Laval, Laval, Quebec, Canada, January 24, 1983 (mimeographed)

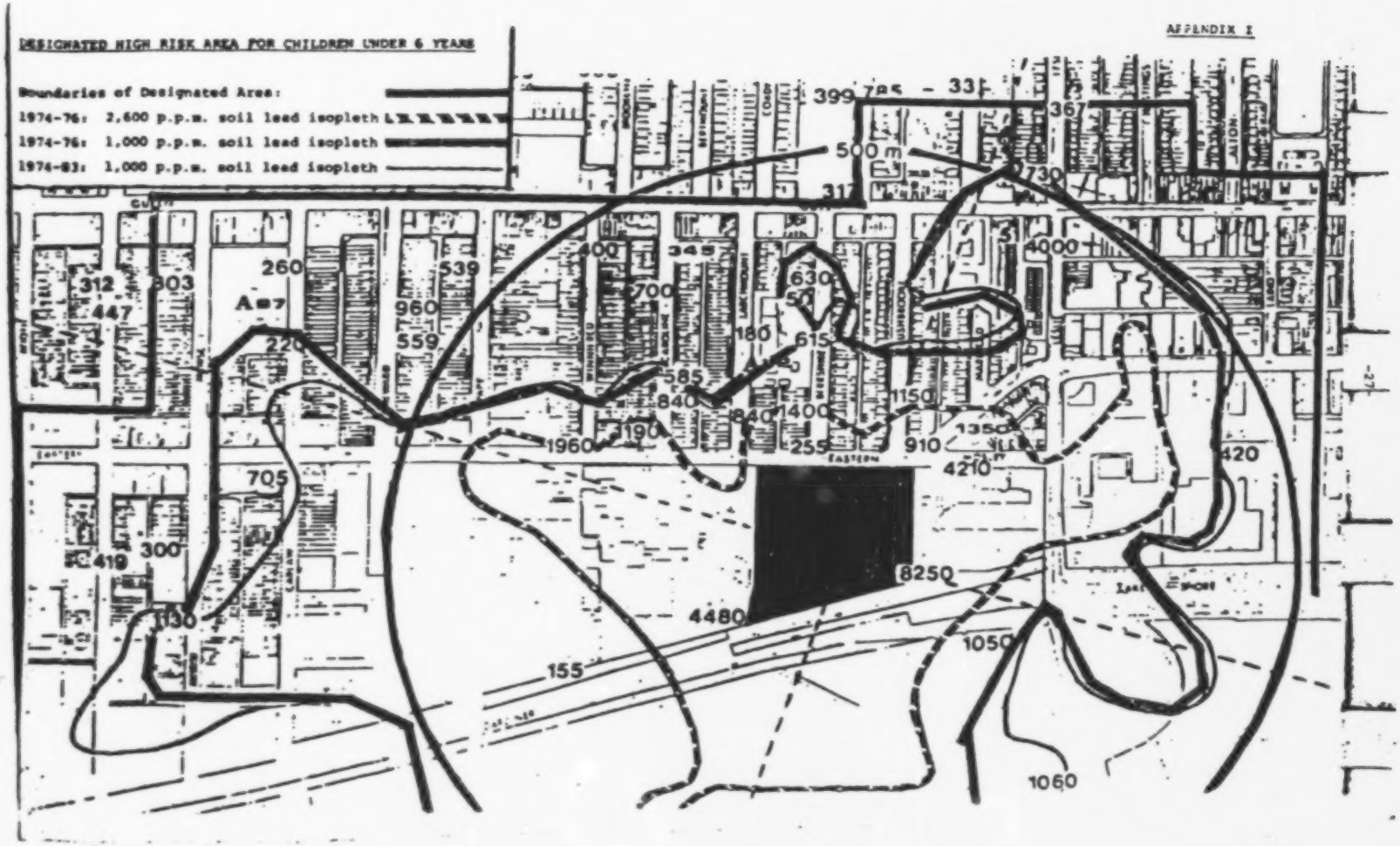
4. Centres for Disease Control "Lead Poisoning" MMWR 1984, 33(45): 638-45

5. Mahaffey, K.R. "Nutritional Factors in Lead Poisoning" Nutrition Review 1981, 39(10): 353.

ACKNOWLEDGEMENTS

We wish to express our appreciation to the Provincial Public Health Laboratory, the Ministry of the Environment, South Riverdale Community Health Centre's Environmental Health Committee, and the staff of the Eastern Health Area during testing and follow-up.

APPENDIX I


DESIGNATED HIGH RISK AREA FOR CHILDREN UNDER 6 YEARS
Boundaries of Designated Area:
1974-76: 2,600 p.p.m. soil lead isopleth
1974-76: 1,000 p.p.m. soil lead isopleth
1974-83: 1,000 p.p.m. soil lead isopleth
399
331
367
500
317
730
4000+
400
345
630
700
180
615
585
840
840
1400
1150
1350
1960
190
255
910
4210
420
705
300
419
8250
4480
1050
155
1060
260
539
312
303
447
960
559
220

APPENDIX II

BRING YOUR CHILD TO THE STREET HEALTH FAIR

FOR CHILDREN UNDER 6 YEARS

LIVING WITHIN THE SHADED AREA

TIPS FOR PARENTS ON;

- minimizing contact with lead
- eating healthy foods
- good tooth care

LEAD TEST

for children under 6 years

A TOOTH FAIRY

free tooth brushes for tested children

VISIT the HEALTH CLOWNS

free balloons

Blood tests in the shaded area on the above map indicate high lead levels (frequently over 1,000 p.p.m.)

Almost 1 out of 5 children tested in 1980 had blood lead levels too high.

The Department of Public Health, Eastern Health Area, recommends that *all children under 6 years and living in the shaded area* have an annual blood test for lead. The test is a simple skin prick. The parent or guardian must sign a consent. The results of the test and advice will be sent to you.

Our Van Will Stop Near Your Home

Stop #1	Monday, September 17 Approx. 6:00 - 7:00 p.m. Laing Street (near Bank)	Stop #7	Thursday, September 20 Approx. 6:00 - 7:00 p.m. 45 Pape Avenue
Stop #2	Approx. 7:15 - 8:30 p.m. John Hall Parking Lot, Queen & Leslie	Stop #8	Approx. 7:15 - 8:30 p.m. Howard Street (mid-block)
Stop #3	Tuesday, September 18 Approx. 6:00 - 7p.m. Rushbrooke (mid-block)	Stop #9	Friday, September 21 Approx. 6:00 - 8:30 p.m. Monro Street Playground
Stop #4	Approx. 7:15 - 8:30 p.m. Bruce Street Schoolyard, Leadmount Avenue	Stop #10	Saturday, September 22 Approx. 10:00 - 12:00 a.m. Monro Street Schoolyard (enter off Monro Street)
Stop #5	Wednesday, September 19 Approx. 6:00 - 7:00 p.m. Crosline Street (mid-block)	Stop #11	Approx. 1:00 - 3:00 p.m. Marigold Avenue (near Leslie & Eastern)
Stop #6	Approx. 7:15 - 8:30 Mansfield Street (mid-block)		

Contingency for Rain
Monday and Tuesday, September 24 and 25 - 6:00 - 8:30 p.m.

City of Toronto
Department of Public Health
Eastern Health Area
In cooperation with the South Riverdale Community Health Centre

For more information call

為未滿六歲兒童而設
之衛牙保健展覽會

健康小丑

牙仙贈送牙刷

根據加內含鈣成份之兒童，凡以鈣一個

給家長們的貼士有關：

- 減少糖份攝取至最少程度
- 吃有營養價值的食物
- 有良好的牙齒護理

- 在一九八二年得到根據加內含鈣的兒童，有不到百分之十，一個兒童之加含鈣成份過高。

公共衛生部門屬下之東區健康分局影響居住在對上陰影的範圍內之六歲以下兒童應每年得到加內含鈣成份之檢驗。這項檢驗是很簡單，只在手指和上檢驗。家長或監護人士填寫字許可。檢驗結果及有關建議將用郵寄給閣下。

我們的專車停泊所上附近的時間表如下：

七月十七日(星期一)
文娛(晚上)六時至七時　第一站　(Long 街(近 School)
七時十五分至八時半　第二站　Alan Mall 時半場
　　Lexus

七月十八日(星期二)
文娛(晚上)六時至七時　第三站　Abercrombie (街)的十號)
七時十五分至八時半　第四站　Gucci 街後面月.
　　Lattimore 下道

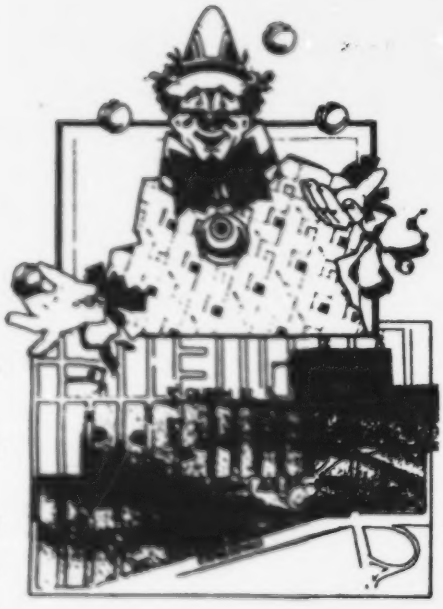
七月十九日(星期三)
(晚上)六時至七時　第五站　Calvin Klein (街)的十號)
七時十五分至八時半　第六站　Abercrombie (街)的十號)

七月二十日(星期四)
(晚上)六時至七時　第七站　Jane 街 95 號
七時十五分至八時半　第八站　Abercrombie (街)的十號)

七月二十一日(星期五)
(晚上)六時至八時半　第九站　Macys 街地下場

七月二十二日(星期六)
(上午)十時至十時十二時　第十站　Macys 街地下場
　　(請看 Macys 街入口)
(下午)一時至三時　第十一站　百貨公司(Macys 之
　　下層)
　　(售仁街道 Lexus)

如欲參加所限制以額外下
七月十四日或十五日
(星期一至星期一)　晚上六時至八時半



本圖上制止陰影的範圍內所進行
三項試驗顯示三歲兒童鉛中
鉛毒是超過 (200 ppm)

每所公共衛生部門屬下之東區健康分局
受每時每個範圍內一歲兒童